Fuel BOOKS

Photographing Fireworks

The Right Gear, Location, and Techniques for Capturing Beautiful Images

ALAN HESS

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Alan Hess

Dedication

To Nadra: Thank you for all your love and support. I couldn’t do any of this without you.

Acknowledgments

Writing is not as easy as it might seem, and it isn't something I do alone in a vacuum. A great deal of work goes into these projects, and it could not get done without the team over at Peachpit: Ted Waitt, Scott Cowlin, Sara Jane Todd, Valerie Witte, Kelly Kordes Anton, and Lisa Brazieal.

A big thank you to my family and friends for your understanding as I run off at the most inconvenient times to set up a tripod to capture the fireworks displays that everyone else is just hanging around and enjoying.

About the Author

Author Photo: Drew Gurian

Alan Hess is a San Diego-based photographer specializing in concert and live-event photography. He has photographed hundreds of concerts in clubs and arenas, including some of the biggest names in music, ranging from Justin Bieber to The Who. Alan is currently the house photographer for a large venue in Southern California where he photographs a wide variety of concerts and events.

When he isn't out shooting concerts, he is writing. Alan has authored numerous photography books, covering such topics as concert photography and the basics of exposure and composition.

Find out more at www.alanhessphotography.com.

Fireworks Basics

The Challenge of Capturing Light in Motion

People are drawn to fireworks displays. The rockets shooting skyward, exploding in bright flashes of color as they drift back to earth, are endlessly exciting. Fireworks are not common occurrences because they signify special occasions and events. The special nature and rarity of these impressive pyrotechnic displays has created a drive to capture and record the colorful explosions and impressive colors against the night sky. With the techniques and tips in this book, you can learn to capture frame-worthy fireworks and create lasting memories.

A Brief History of Fireworks

Fireworks have been around for a very long time. They were invented hundreds of years ago in the Far East, and then made their way west when Marco Polo brought firecrackers to Italy in 1292. Essentially, they were gunpowder stuffed into bamboo shoots (later in paper tubes) that showered orange sparks. In the 1600s, fireworks were brought over to the Americas and the first

Fourth of July fireworks display was held in 1777, a year after the Declaration of Independence was signed.

The bright colors that are standard in today's fireworks displays were created back in the 1830s by the Italians, who started to add metallic salts to the mixture. The different salts produced different colors, adding reds, greens, blues, and yellows to the original orange.

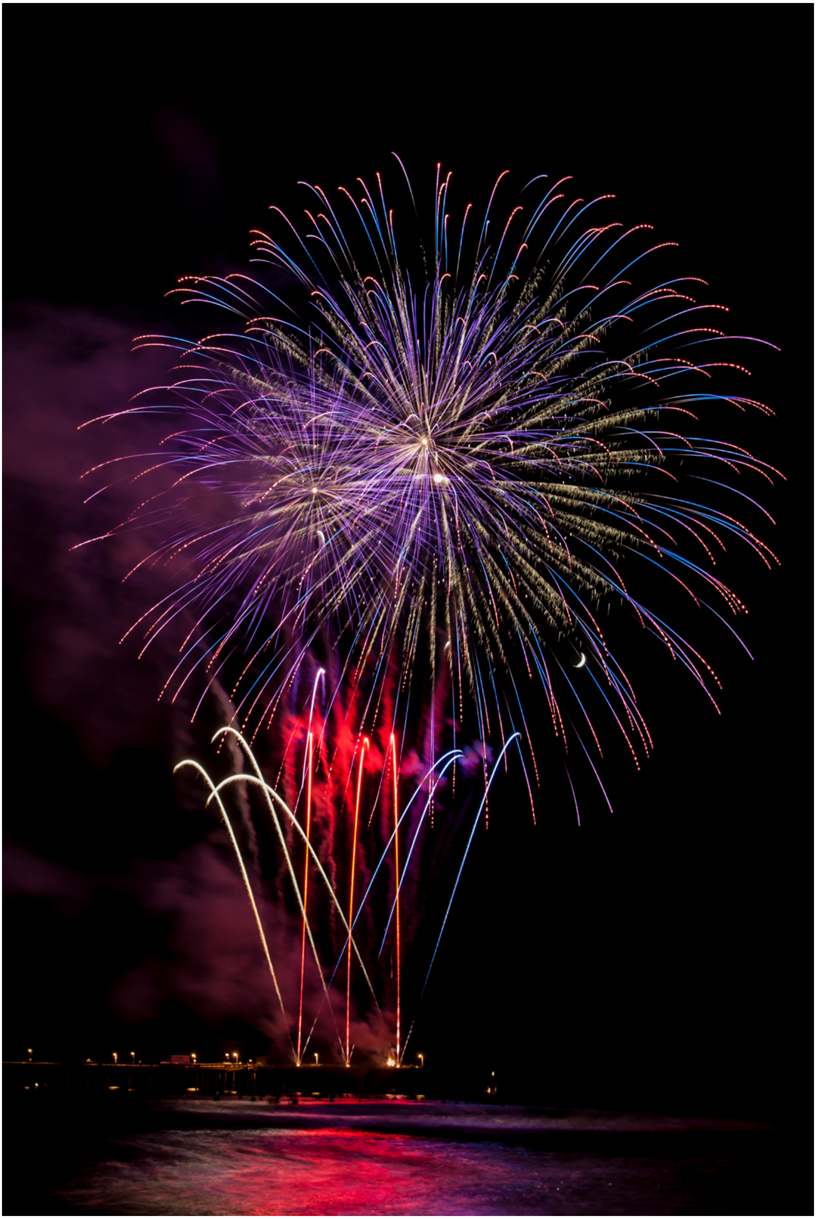
Fireworks have been used to commemorate special occasions for many years, and they draw huge crowds of spectators. There is something awesome about watching a fireworks display, and that awe drives photographers to try and capture the display.

ISO 400, 4.7 seconds, f/16

Multiple explosions of different colors are standard in modern fireworks displays.

How Fireworks *Work*

To understand what it is you are photographing, you need to understand a little about how fireworks actually work. The aerial fireworks that you see in these photographs consist of a shell that is launched high into the air. Then a charge in the middle of the shell ignites a set of smaller shells that burn brightly as they first explode outward and then fall back to earth. These bright, burning pieces can be made to show different patterns and colors as they explode and travel through the night sky.



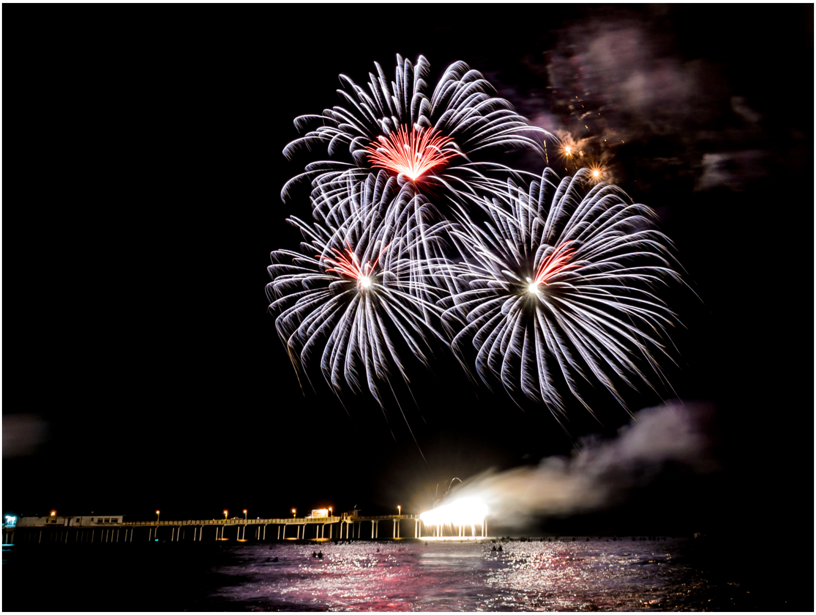
ISO 200, 8.3 seconds, f/10

The light trails created by the fireworks change color as the different materials burn.

To successfully capture a fireworks display, you need to actually capture the light trails produced as the burning elements travel through the sky. To do this, the shutter on your camera needs to be open for quite a long time to allow for the movement of light to be recorded. The great advantage of digital photography is that the camera screen provides instant feedback after each shot. This allows you to make adjustments while the fireworks display is still going on.

There are challenges to photographing fireworks, and chief among them is getting the exposure right. The exposure is controlled by three camera settings: the ISO, the Shutter Speed, and the Aperture. When you allow the camera to take control of any of these three things, it uses the built-in light meter to read the amount of light in the scene and automatically adjust the settings. For example, in Auto or Program Auto (P) mode, the camera sets both the Shutter Speed and the Aperture based on the ISO you set along with its built-in light meter reading. When you use Aperture Priority, you set the ISO and Aperture, but the camera picks the Shutter Speed based on the light meter reading. When you choose Shutter Speed Priority, the camera picks the Aperture based on your choices for Shutter Speed and ISO and the built-in light meter reading.

The challenge to shooting fireworks is that the camera can’t measure the amount of light—because there is no light to measure until the fireworks go off. And because you are trying to get a shot of the trails made by the actual light source, the camera would have to be able to read the amount of light present over time and it can’t do that. And even if a camera could, each firework is slightly different so the amount of light present is slightly different. All of this makes it impossible to meter the scene with the camera.



ISO 200, 7.4 seconds, f/11

A fireworks display in a high wind creates a different look to the clean light trails.

Therefore, to successfully capture fireworks, you have to shoot in Manual mode and control all the exposure settings yourself. The settings are pretty simple: Set the ISO to the lowest setting, the Aperture to one of the middle settings, and then manually control how long the shutter is open. Read on to get all the details.

TIP:

You can use the techniques learned here to capture the light trails from cars in motion or even the trails made with sparklers in the backyard. Just stay safe.

Gear

What You Need to Get That Perfect Shot

To photograph fireworks, you need a camera, a lens, a way to keep the camera still during the fireworks, and a good way to trigger the shutter without moving the camera. The good news is that you can buy most of these things for reasonable prices. Chances are you already have a camera and lens that will work just fine, and you might even have a tripod. You may not have a remote to trigger the camera, but they are really inexpensive and easy to set up. Let’s take a look at each piece of gear, optimized for fireworks photography.

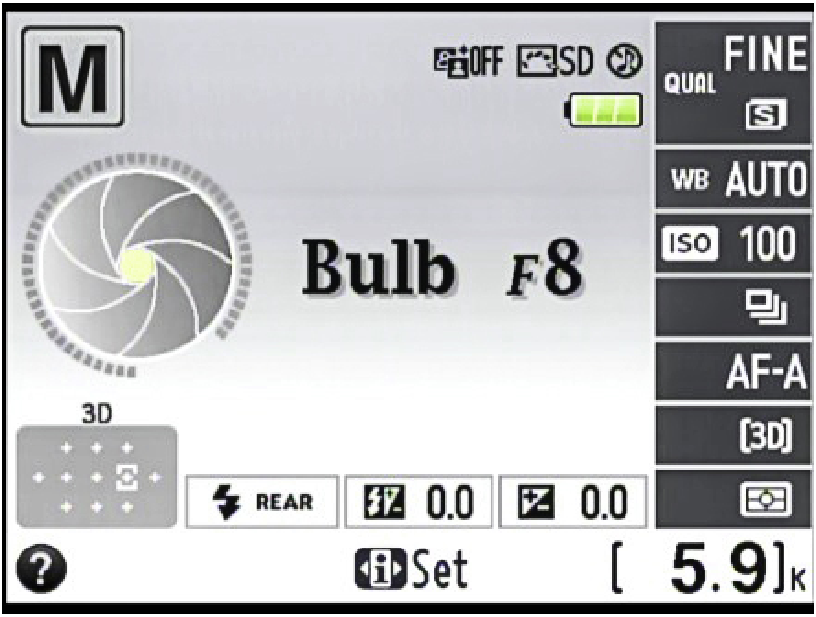
Cameras

You can take photos of fireworks with just about any camera and lens. There is, however, one camera feature that can make shooting fireworks a whole lot easier: a Bulb Shutter Speed setting.

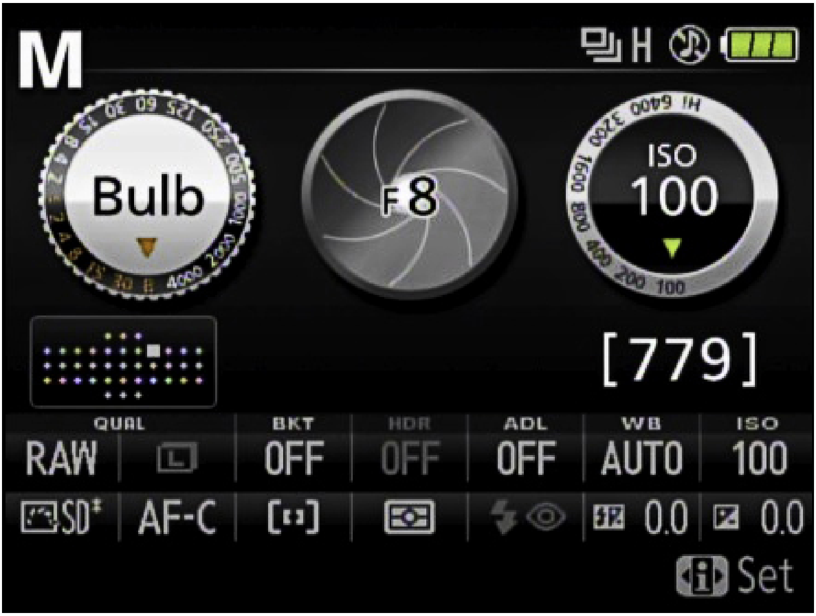
The Bulb mode allows the shutter to stay open for as long as the shutter release button is pressed. The setting name, Bulb, reflects the old pneumatically controlled shutters—for which squeezing an air bulb opened the shutter and releasing the air bulb closed it—and the idea remains the same. With the camera in Bulb mode, you can just hold down the shutter release button and the shutter stays open until you release the button. This is important when it comes to shooting fireworks because you want to open the shutter when the rockets soar skyward, and close it after the trails have died off. That could be 10 seconds, or it could be 15. It changes from shell to shell.

Check your camera's user guide for how to set the Bulb mode on your camera. An easy way to try it out on the camera is as follows:

1. Turn the camera on.
2. Set the exposure mode to Manual (M).
3. Adjust the camera to the lowest Shutter Speed possible.
4. If the camera can shoot in Bulb mode, Bulb (B) will display.



M
OFF SD
QUAL FINE
WB AUTO
ISO 100
AF-A
[3D]
Bulb F8
3D
REAR
0.0
0.0
Set
[5.9]K



M

Bulb

F8

ISO 100

[779]

QUAL RAW

BKT OFF

HDR OFF

ADL OFF

WB AUTO

ISO 100

SD AF-C 0.0 0.0

As you can see in the setting screens, the Nikon D3200 and the Nikon D5200 each have a Bulb setting for Shutter Speed.

For the Bulb setting to appear, the camera needs to be set to Manual exposure mode. This stands to reason because the camera has no idea what the shutter speed will be, and therefore cannot calculate the exposure. That means that the Program Auto mode, Shutter Speed Priority mode, and Aperture Priority modes can't function properly. (And this is a good thing because taking fireworks photos works best in Manual mode.)

If the camera does not have a Bulb setting, you will have to use one of the available shutter speeds instead. It's not the end of the world, but it is a little more difficult to get the timing just right. Timing is covered fully.

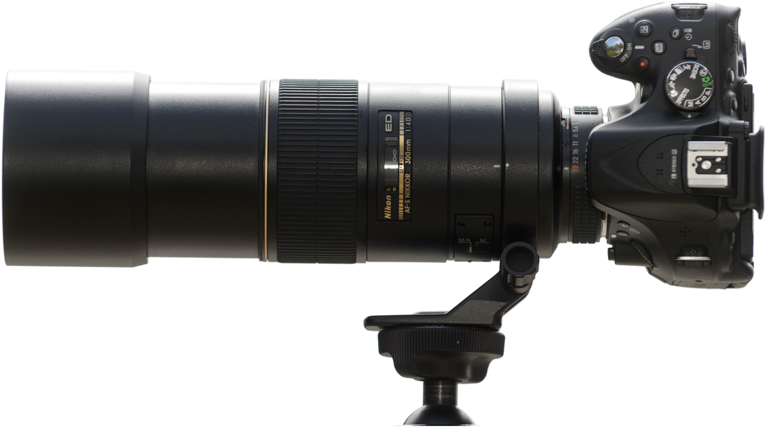
Lenses

Fireworks are really bright, so there is no need for lenses that can open really wide. As you will see, apertures of f/8 or f/11—or even f/16—all work well for capturing the light trails of fireworks. For this type of photography, the lens choice is based on the focal length and how much of the scene you want to capture. Use a zoom lens (ideally a 200mm or more) if you can get in tight and capture just the fireworks themselves. Conversely, if you want to give a sense of place, you will want to shoot wider so you can get more of the location in your images. A lens such as the 18-300mm f/3.5-5.6 works really well for this type of shooting. You can set up your tripod and then zoom in or out as needed to get the composition you want.

ISO 100, 16 seconds, f/16

A 35mm focal length on a cropped sensor allowed me to capture this whole scene.

When using a very long lens, like the 70-200mm f/2.8 or longer, you will want to attach the tripod to the lens itself. This type of lens comes with a tripod collar especially made for this. The lens you choose depends on how far away you are from the fireworks and how much of the surrounding area you want in your photos.



When using a long lens like the Nikon 300mm f/4.0, make sure the lens —not the camera—is attached to the tripod head.

TIP:

I personally like to shoot a little wide so that I don't miss any of the really high bursts—and I can always crop later.

Make sure you turn off any Vibration Reduction (Nikon) and Image Stabilization (Canon) on the lens unless your camera's feature is specifically designed for use on a tripod. The Vibration Reduction and Image Stabilization technologies try to counteract any camera shake that occurs when handholding the camera at low shutter speeds; these technologies are not designed for when the camera is on a tripod.

Tripods

To successfully capture fireworks, the most important piece of equipment you need is something to keep your camera stable so that it doesn't move during the exposure. This is a job for a tripod.

Tripods actually consist of two different parts: the legs and the head. Some tripods come with a head already attached, while others are sold separately. That way, you can buy the legs you want and the head you want to create the perfect tripod for you.

Following are some factors to consider when selecting a tripod and tripod head.

Weight

The weight of the tripod is important because you need to carry it with you. The heavier the tripod, the harder it will be to take with you and the greater the chances you will leave it at home. The weight of the tripod is determined by the size and the materials used. The tradeoff is that the lighter the tripod, the more expensive it can be.

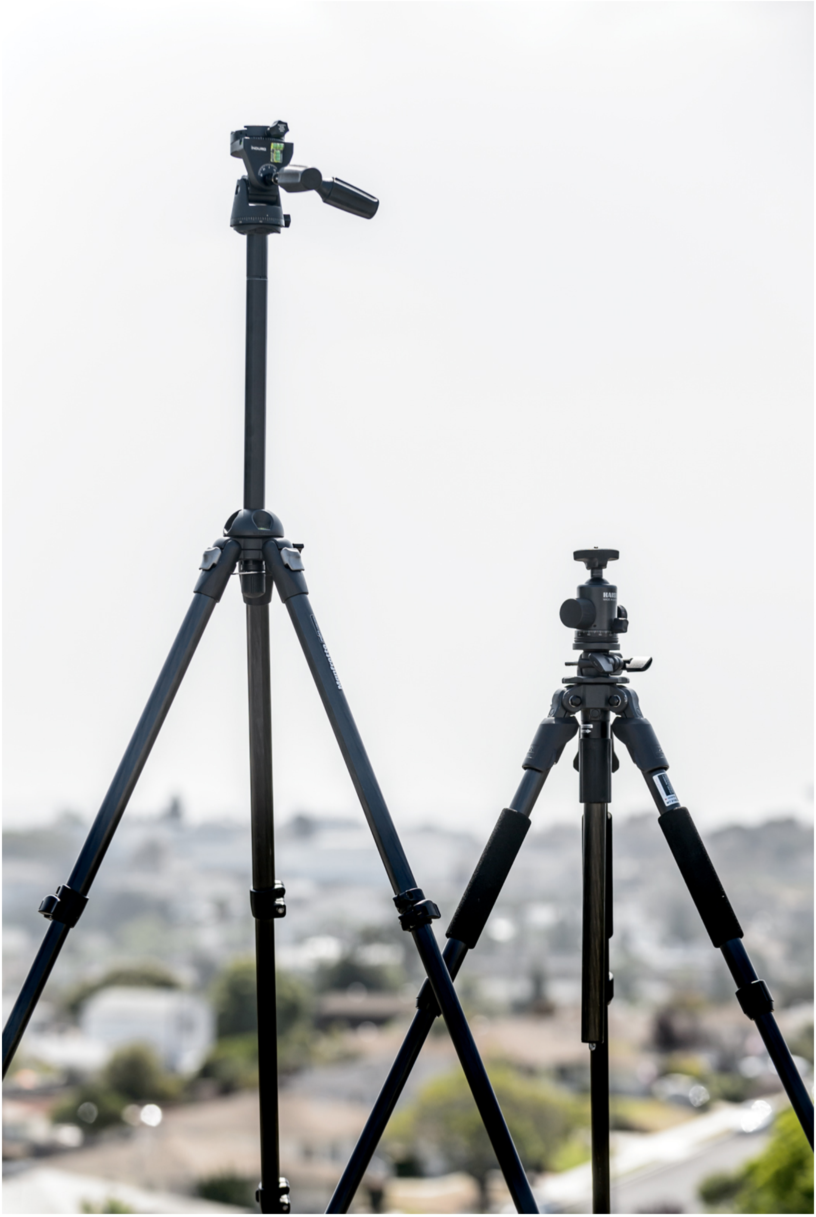
Materials

Tripod legs come in a variety of materials, ranging from traditional woods to space-age composites such as carbon fiber. The different materials offer different features (rigidity, vibration dampening, and lightweight) and they all come at different costs. Materials like carbon fiber have great rigidity and vibration dampening and are very light, but they come at a very high cost. Aluminum is rigid and relatively inexpensive, but it's not as good at dampening vibrations and it is pretty heavy.

Height

Tripods come in a variety of heights, ranging from tabletop models that raise a few inches to those that go higher than me (over 6 feet tall). For photographing fireworks, you need a tripod that is high enough to allow you to work comfortably while standing when the camera is aimed skyward. Many tripods come with a center column that you can raise in order to elevate the camera. The problem with these is that raising this center column can cause the camera to be less stable. I only use the center column to add height in emergency situations, and when I do, I only raise it up as high as needed.

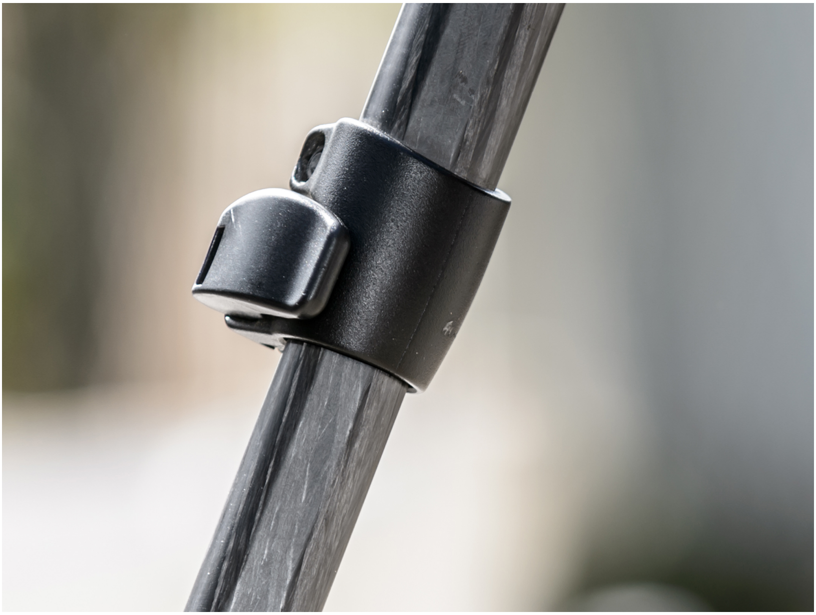
Tripods come in different heights. Make sure you get one that is comfortable for you to shoot with while standing.



Raising the tripod's center column adds height but it does lose some of the stability.

Leg locks

For portability, tripod legs extend and collapse. When you need to use the tripod, the legs lock back into place using different types of leg locking mechanisms. Make sure to select a tripod with secure and easy-to-use locking mechanisms. I prefer the lever lock type as I just find them easier to use, especially in the dark. The twist locks are more compact and work just as well as the lever locks. Go to a camera store and try both types to see which ones you prefer.

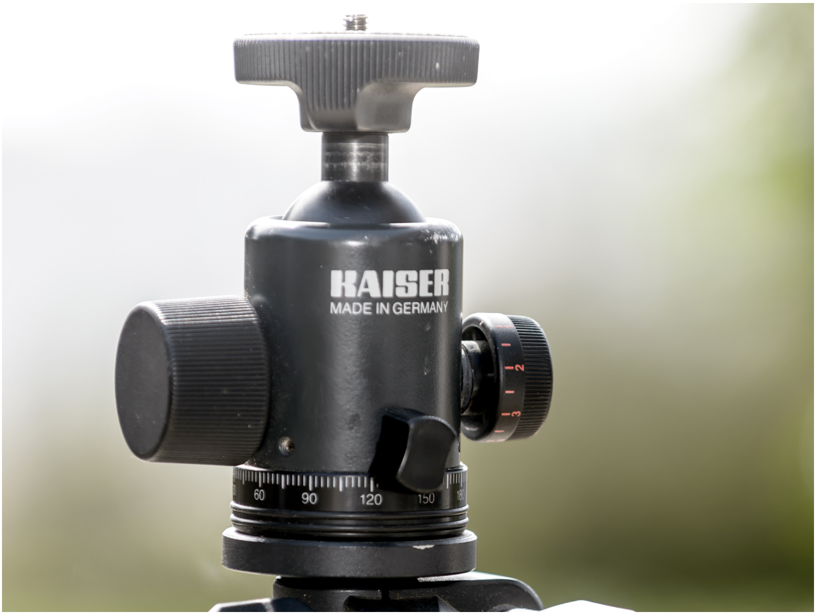


Flip the lever lock to lock and unlock the tripod legs.

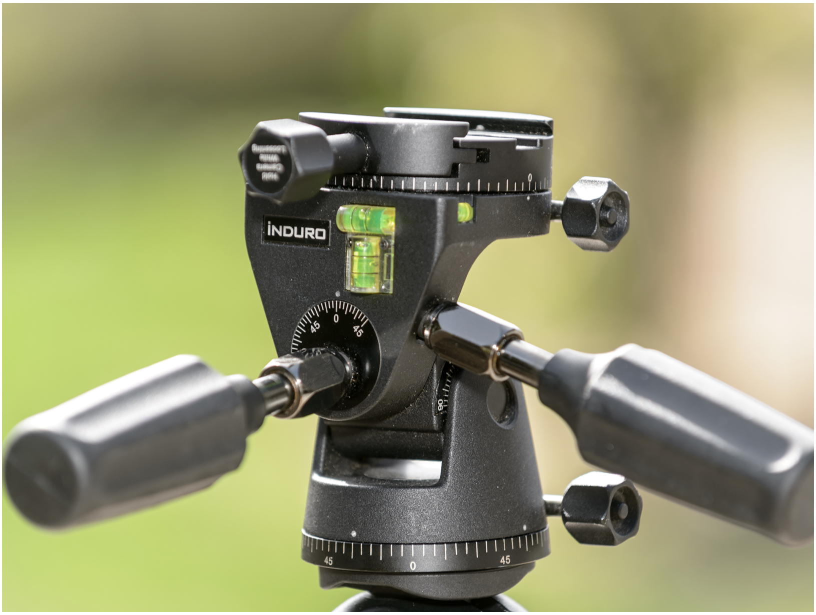
The twist locks open and close just by turning them.

Tripod heads

The tripod head connects the camera to the tripod legs. To shoot fireworks, all you need is one that securely holds the camera. Many different types of tripod heads are available, but the two most common are the ball head and the pan/tilt head. The ball head can be maneuvered very easily into just about any angle. You just loosen the tension, reposition the camera, and then tighten the ball up again. The pan/tilt head has a separate control for each angle, which makes it great for really precise repositioning. Either one of these tripod heads will work for fireworks.



The ball head on my tripod allows for quick adjustments by just loosening the main knob, moving the camera, and then tightening the knob.



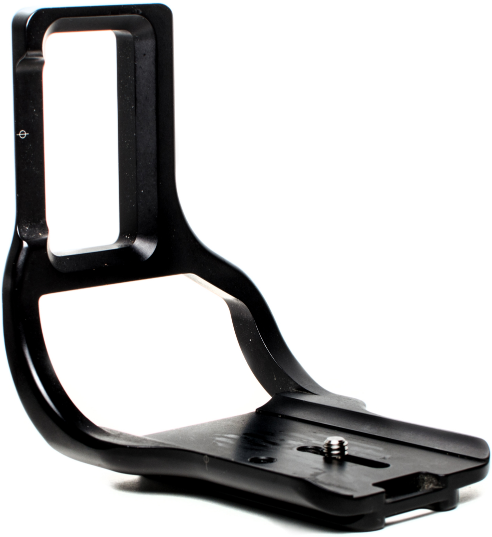
The pan/tilt head on this tripod allows for very precise adjustments.

Cost

Tripods come in a huge array of prices, from pretty cheap to very expensive. I really believe that you get what you pay for. The lighter and more stable the tripod, the more expensive it is going to be. One question that only you can answer is "How much use is your tripod going to get?" If you plan to use a tripod a lot—for night photography, landscapes, or even just in the studio—consider spending a little more to get one that will last longer. A good tripod can last a lifetime if taken care of (see the "Tripod Maintenance" sidebar).

How to Attach the Camera

There are two methods of attaching the camera to the tripod head. In the first method, the tripod screws directly into the tripod mounting hole on the bottom of the camera. The second method uses a quick release. With a quick release, a piece is mounted to the camera that keeps the camera securely attached but allows for quick and easy installation and removal of the tripod. I am partial to the L type of brackets, which allow for speedy changes from portrait to landscape orientation.



The L plate for my Nikon D4 allows me to quickly and easily mount the camera in either portrait or landscape orientation. You can see where the L plate mounting screw attaches to the camera.

Tripod Maintenance

With a little tender loving care, a tripod can last for a very long time. I wipe down my tripod after every use, mainly because I live in San Diego and the salt air combined with a lot of beach shooting can really wreak havoc on my equipment. These tips can help prolong the life of your tripod and keep it in good working order.

- **Check or change the feet.** Did you know that some tripods have interchangeable feet? Most tripod feet can be unscrewed and replaced. This allows you to use the correct feet for the surface that you are shooting on. For example, use soft rubber feet when shooting indoors or on rocks, and use spike feet when shooting outdoors on sand or grass. You want the tripod to be as stable as possible, so make sure the feet are in good condition. The easiest way to keep them in good shape is to replace them when they become worn out.
- **Clean the twist locks.** For tripods with twist locks, it's really easy for them to get gummed up with just a little dirt or sand. When that happens, it becomes really tough for the locks to be tightened or loosened, making the tripod les stable. When this happens, simply unscrew the lock until it comes all the way off the threads and slides down onto the next section of tripod leg. The threads might be covered in a lubricant; check to see how much dirt and grit is present and wipe it clean if necessary. Take the leg all the way out and examine the shims. Wipe off the dirt and grime and reassemble the tripod leg. You might need to use a dry powder graphite lubricant on the leg section. (Do not

use a spray lubricant as it can actually trap dirt.) For the lubricant on the threads, a silicon lubricant such as Versilube works well. Do one lock at a time—each section is a different size. You don't want to end up with a bunch of parts lying around, forcing you to figure out which one fits properly.

- **Clean and adjust the tension of the lever locks.** The lever locks can loosen up over time and the legs can start to slip. When this happens, you will need to tighten the lever up so the legs lock tight. You will need either a nut driver or hex key to adjust the bolt on the lever lock. Just unlock the leg then adjust the tension from the other side. Small adjustments go a long way. If the lever lock has a lot of dirt in it, just take the lock apart, wipe the parts clean, and reassemble. (Watch out for the tension spring located inside the lock—it probably won't come out, but it could. If it does, just put it back in the same way it came out.)
- **Clean the tripod head.** I have never had to take a tripod head apart, but that doesn't mean I don't clean it. As I said before, I wipe the head down after every use and make sure the tripod head is still securely attached to the legs. I also use a can of compressed air to blow out any dirt on the head itself.
- **Replacement parts.** If you need parts, they can be a little tough to find. For Bogen tripods, check out www.bogentripodparts.com/parts.htm and for Gitzo tripods, try www.gitzo.com/service/service+repair/. Both sites allow you to get parts for their tripods.

A tripod is an essential piece of equipment for any photographer planning on doing long exposures. Take care of yours and it can last for many years.

Remote / Cable Release

The final piece of the gear puzzle is a remote trigger for your camera. With a remote or cable release, you can stand next to the camera, watch the fireworks, and trigger the camera's shutter release button without actually touching the camera.

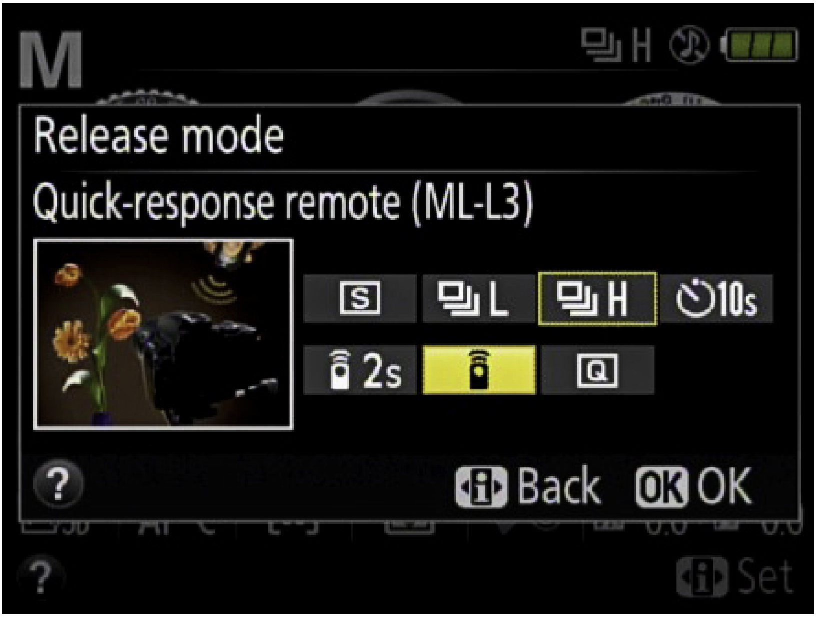
Wireless remote

A wireless remote triggers the camera's shutter release button from a distance without you having to touch the camera. Many consumer-level cameras come with a built-in receiver and the remotes are really inexpensive. For example, the Nikon ML-L3 is only $20 and can trigger a wide range of Nikon consumer-level DSLR and compact cameras. Canon offers the Wireless Remote Controller RC-6, which retails for $20 and can trigger a wide range of the Canon cameras.

The Nikon ML-L3 remote triggers the Nikon D5200 camera and a wide range of other consumer-level Nikons.

To use the remote with your camera, read your camera's user guide and find out how to set the correct drive mode. These remotes are rather simple in design—usually pressing a single button will trigger the shutter release. When the camera's Shutter Speed is set to Bulb, pressing the remote once opens the shutter, and pressing it a second time closes the shutter.

It's important to know where the remote sensor is on the camera because these remotes need a line of sight to work. You need to make sure the remote is pointed at the right part of the camera or it won't work. Another significant thing to know—you may need to reset the drive move. Many cameras have a time limit on how long they will wait for a signal from the remote before reverting to the previous drive mode. If you set up your camera and then wait for a while to start shooting, the remote might not work. Right before the fireworks display starts, therefore, check to make sure the camera is ready to receive the signal from the remote.



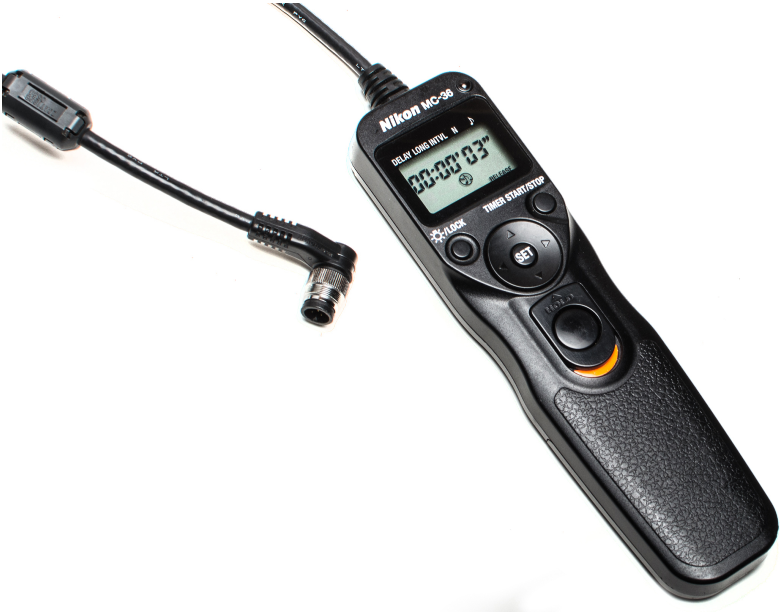
The Nikon D5200 drive menu where you set the camera to use the ML-L3 remote.

Cable release

A cable release attaches to the camera with a cable and allows for remote shutter release. Many different types of cable releases are available, from the very simple to the complicated. They usually cost a little more (in some cases, a lot more) than remotes, but those expensive models can do a lot more than just trigger the shutter. When it comes to photographing fireworks, a cable release can not only remotely trigger the shutter but it can keep the shutter open as long as you want when using Bulb mode. Cable releases all work the same way: press and hold the button for as long as you want the shutter to stay open. This allows you to watch the fireworks and trigger the camera at the same time.

The simplest Nikon cable release is the Nikon MC-DC2 Remote Cable Release, which retails for about $35 and can trigger consumer-level DSLRs. The remote has a single button that triggers the shutter on the camera when pressed. The Nikon MC30a Remote Cable Release, which retails for $65 or so, works with the Nikon cameras that have a 10-pin remote terminal. The remote is basically just a large button that you hold down for as long as you want the shutter to stay open.

My favorite cable release is the Nikon MC-36A Multi-Function Remote, which offers a lot more than just a trigger. It can act as a timer and allow you to do time lapse for any of the Nikon cameras with a 10-pin remote terminal. It does cost a lot more at about $160.



Notice that the shutter release button is locked in the down position on the Nikon MC-36A Multi-Function remote.

The Canon RS-60E3 Remote Switch, which costs $25 or so, is designed for the Rebel line of cameras. There is also the Canon RS-80N3 Remote Switch for the pro-level cameras at $50.

The Right Location

Vantage Point and Camera Orientation Are Key

Planning where to photograph a fireworks display is important. You will want a vantage point with an unobstructed view of where the fireworks are going to explode. It is also great to be able to see exactly where the fireworks are being shot from, which allows you to see the launch and better time your shots. In San Diego, most fireworks displays take place over water because it's a lot safer—and it makes for great images as the fireworks are reflected in the water. Picking the right location makes for better images.

Research the Conditions

I am a big fan of researching as much as possible before each shoot. The more research I do, the better prepared I am for the shoot. For fireworks displays, the first thing to do is look for images shot during the last fireworks show at the same location. This gives you an idea of what to expect and where the images might be taken. If possible, I try to check out the location at least a day before the show to see the best place to shoot from. I go during the day so that I can see any items that may interfere with my shots that wouldn't be visible in the dark.

Before heading out to shoot the Fourth of July fireworks last year, I *looked up my images from previous years to check for the best angles and the wind direction.*

TIP:

Check the weather forecast to see if you can find out the expected wind direction. Knowing the wind direction can really help you, especially towards the end of the display. Ideally, you want the smoke to travel away from you. This reduces the amount of haze and makes for better photos.

Once you decide where to shoot the fireworks from, you need to get there early—before the other spectators—to get an unobstructed view. This might be the hardest part of the whole shoot. To get the best spot, you may need to set up hours early and camp out until the display starts.

TIP:

You may need a permit to photograph a fireworks display; see the Tricks of the Trade chapter for details.

Foreground and Background

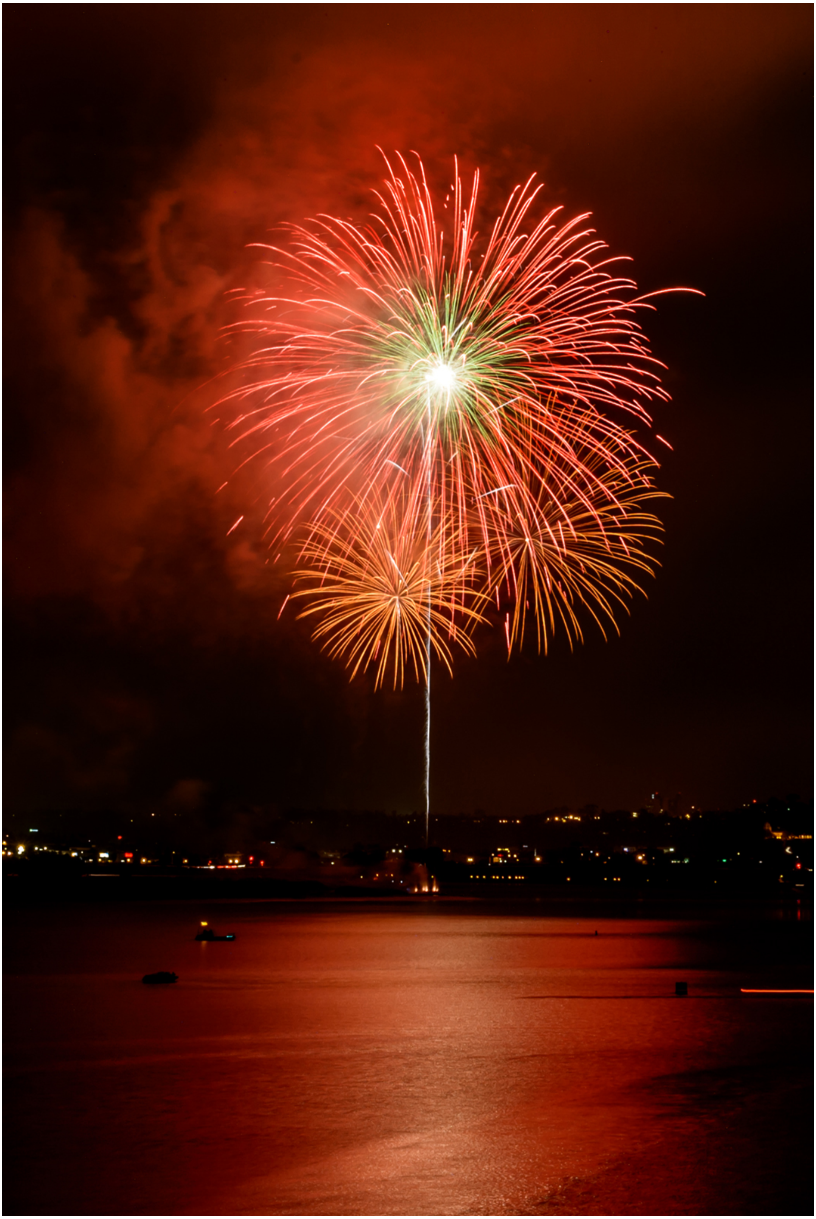
When shooting landscapes, you want to have something in the foreground, the middleground, and the background. You can use this compositional guideline when it comes to photographing fireworks as well. With fireworks photos, the pyrotechnic display is the background element, so you need to decide what the foreground element is going to be. If you decide to shoot the fireworks as the foreground element, then there will be no other elements and the image is just an exercise in color and shapes.

If you are going to use a foreground element, make sure that it is clear and defined (and not people’s heads bobbing up into your shots). Be sure to consider what impact your camera setup and shooting will have on others around you.

For this shot, I wanted to make sure the crowd gathered on the beach was visible in the frame.

Take note of where fireworks are being set up and what parts of the sky they are likely to illuminate. You might try asking some of the people setting up the display for a little information on what they are planning. Also consider what focal lengths you might want to use and choose appropriate lenses at this time (rather than in the middle of the show).

Many firework displays take place near or over water. This lowers the odds of the fireworks actually setting anything on fire and is a great bonus for taking photos. If you are shooting a fireworks display around water, look for a vantage point that will allow you to capture the reflection of the fireworks in the water. These make for really great images and the slower Shutter Speeds used can even help to smooth out the water.



Photographing the fireworks display from the bridge over the bay allowed me to capture not only the fireworks, but the reflection as well.

TIP:

Watch for power lines and telephone poles. One of the best reasons to set up early is the opportunity to check for distracting elements in the

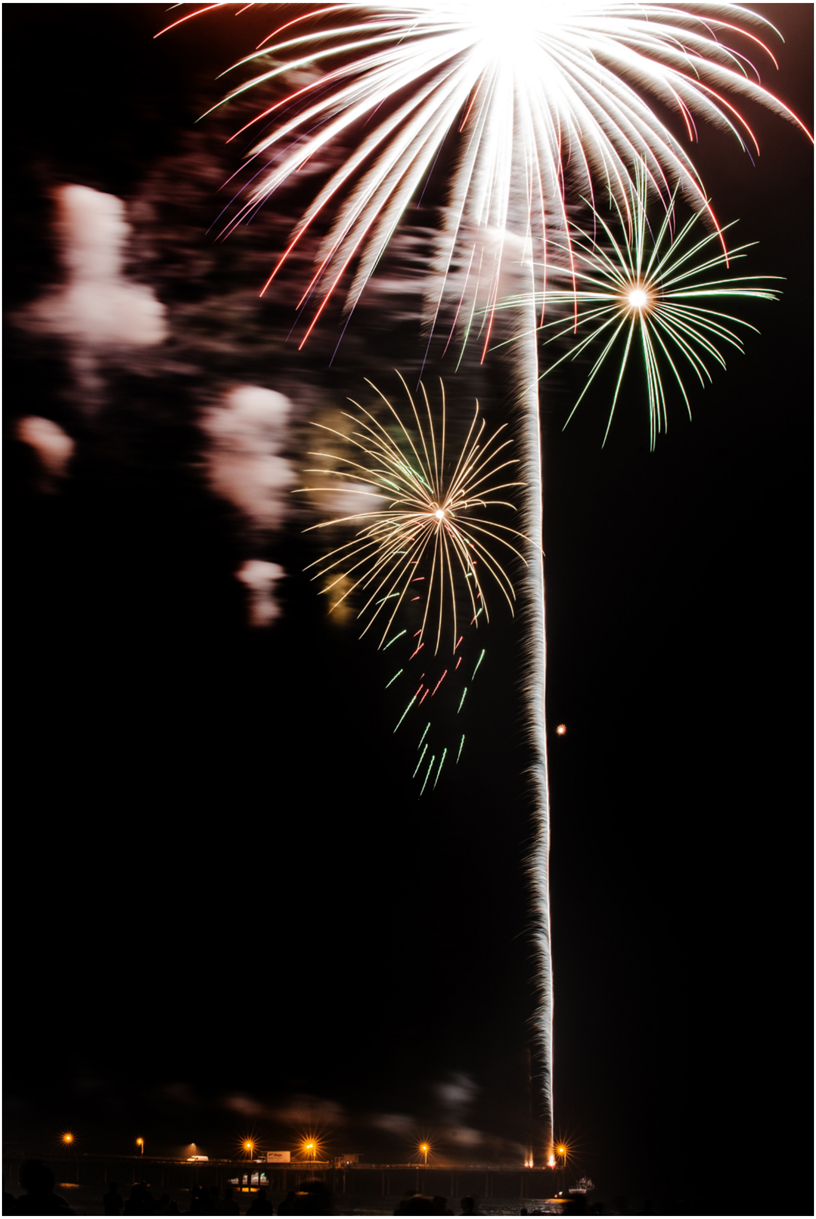
daylight.

TIP:

Set the right focal length. OK, so there isn’t really a right focal length for shooting fireworks, but it is a good idea to frame the scene a little wider and crop afterwards if needed. Be sure you are not in so tight on the fireworks that stray light trails lead the viewer’s eye right out of the photo, especially at the top of the frame. Many firework displays take place at multiple levels with shells exploding at different heights.

Camera Orientation

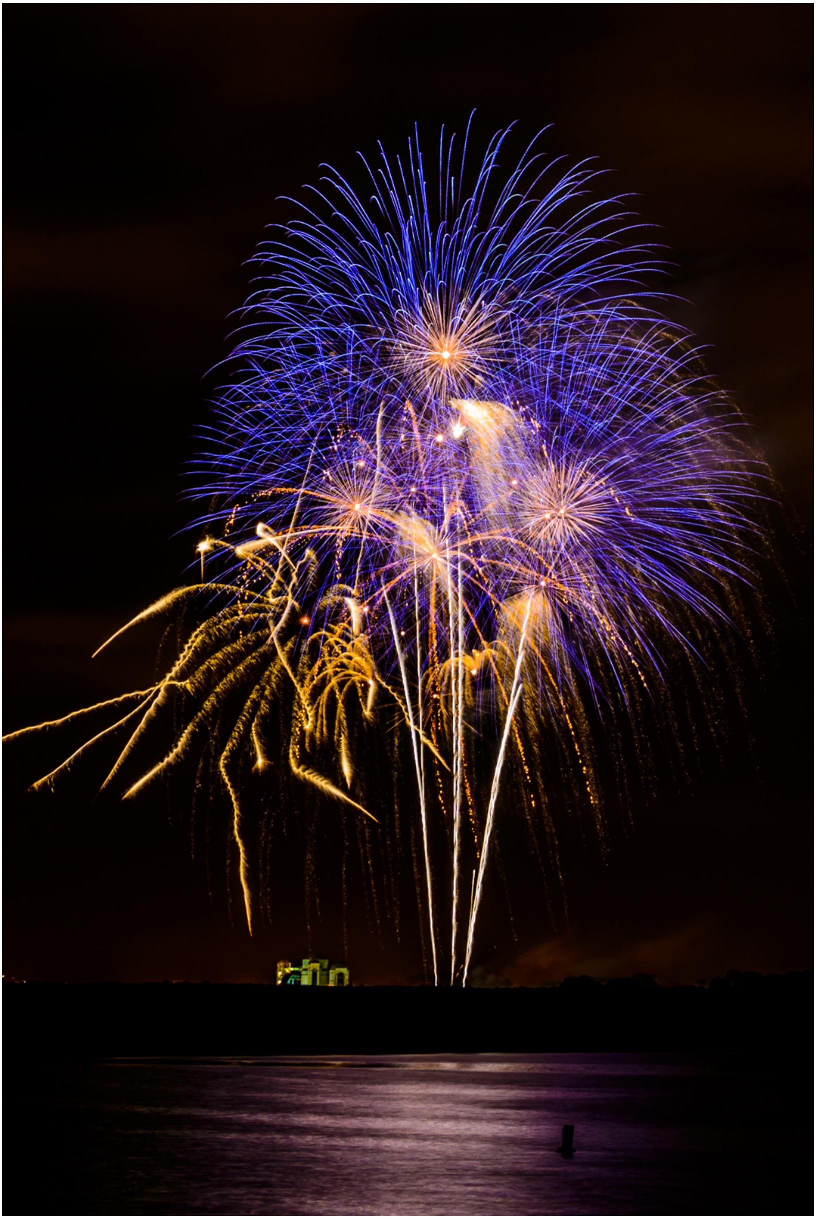
One of the first decisions to make is how you are going to position the camera. There are two main ways of framing shots in all types of photography, vertically (portrait) or horizontally (landscape). Both can work in fireworks photography, but I personally prefer the vertical perspective—because there is a lot of vertical motion in fireworks. Horizontal shots can work if you’re going for more of a wider shot or if you want to capture multiple bursts that are spread out. No matter which orientation you pick, be sure to compose the images wide enough so that the fireworks don’t just fly right out of the frame. This can lead the viewer’s eye right out of the frame as well.



Not leaving enough space on the top of the frame caused the fireworks to explode out of the frame.

Remember how you framed the image so you can keep an eye on that segment of the sky. I find that when I photograph fireworks that I spend less time looking through the viewfinder and more looking at the sky directly. This will help you anticipate the right time to take a shot as you'll see the light trails from the rockets shooting into the sky.

When setting up your camera, check to make sure that any horizons in the image are straight. If you are shooting a wider scene with foreground or background elements, such as a cityscape, be sure the horizon is straight before you start shooting. This is not as important, however, when composing tight fireworks shots that don't include the horizon.



In this image, the fireworks were set off on the other side of the peninsula and the water is clearly seen on the bottom of the frame. I made sure the horizon line was straight across the frame.

Photographing the Show

The Camera Settings You Need to Know

The real fun starts when you are actually out there photographing the fireworks. Since the actual fireworks show doesn't last that long—and there are no reshoots—preparation is key. I break the shooting down into three distinct parts: before the show, during the show, and the end of the show. Most of the work takes place before the show to ensure that the photography during the show goes smoothly. The finale at the end of the show is the most difficult part to photograph because there are more fireworks in less time, making the exposures more difficult.

Before the Show

As you saw earlier, there is a lot you can do before the actual fireworks show to make it a successful shoot. The reality is that even the biggest, longest fireworks displays only last about 30 minutes—and they are usually a lot shorter. Here in San Diego, SeaWorld's summer and holiday fireworks displays last less than 10 minutes. Only the Fourth of July show lasts longer. That's not a lot of time to actually photograph, so you want to have everything as prepared as possible before you photograph the first colorful burst.

Prep your camera

Make sure you have a fresh battery and enough space on your memory card to capture the whole event. You don't want to have to change batteries or memory cards during the shoot. Once the fireworks begin, you don't want to stop. To get started, you need to turn two things off: the Flash and the long exposure Noise Reduction. Many times the camera will try to apply Noise Reduction to images taken at longer Shutter Speeds. The longer the shutter is open and the sensor is on, the hotter the sensor gets; this can, in turn, create digital noise. The camera tries to counteract this noise with a setting that looks at the image and tries to reduce the random color spots. The problem is that this can take as long as the original exposure—meaning that you can't take another photo until the Noise Reduction is done. This delay can really mess up your timing.

Set up the tripod

Once you decide on a site, the first thing to do is set up your tripod. Make sure the legs are properly locked and on solid ground. In fact, recheck the ground under the tripod to confirm that it's not going to change between when you set up the tripod and when the fireworks go off. I'm based in San Diego and many of the fireworks displays take place close to the beach. When setting up a tripod to capture a Fourth of July display a few years ago, I did not take into account the rising tide. By the time the display started, I was scrambling to move my gear to a drier area and I missed much of the show.

Terms to Know

Before you start pressing buttons on your camera, it's helpful to know a few basic terms.

- **Aperture:** The size of the opening in the lens that allows light to reach the sensor.
- **Focal length:** The amount of area in front of the camera that is captured —the smaller the focal length, the wider the view.
- **Frame:** The composition of the image—what is and what isn't included

in the image.

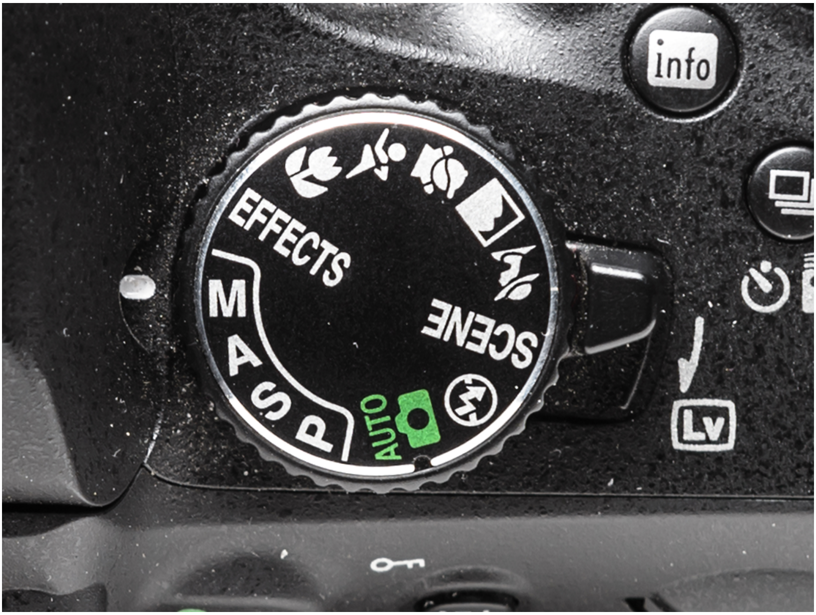
- **ISO:** The sensitivity of the image sensor to light.
- **Shutter Speed:** The length of time the shutter is open allowing light to reach the sensor.

Set the ISO

Set the ISO to the lowest native setting on your camera—usually ISO 100 or ISO 200. You can find this out in the camera's user guide, but if you have no idea where that is, set it to ISO 200. In the past, the long exposures needed for capturing fireworks meant that the digital sensor was on for a long time, which created heat and, in turn, created digital noise. This digital noise showed up as unwanted dots of color in the dark areas of images. The newer cameras still have long exposure digital noise, but it is much better than it used to be. Fireworks are very bright, so a lower ISO allows for a longer Shutter Speed without overexposing the scene and with as little noise as possible.

Set the exposure mode to Manual

Make sure the camera is set to Manual exposure mode so it doesn't try to set any of the exposure controls. You do not have to worry about setting the Metering mode because you won't be using it. Manual mode can be a little scary for some because you can very easily underexpose or overexpose your images, but it is absolutely the only way to successfully capture fireworks.



Just turn the mode dial to M for Manual mode.

Set the Aperture

The aperture controls the size of the opening in the lens and how much light is allowed to pass through to the camera. Because the fireworks are bright, the lens does not need to open wide and an aperture of f/8.0 or f/11 works great.

TIP:

I set the aperture to f/8.0 to start with, and then I usually change it to f/11 or even f/16 for the finale. Multiple rockets shooting skyward at the same time creates a brighter scene. If you continue to use the Aperture and Shutter Speed settings from earlier in the show, the images will be overexposed.

Attach the camera to the tripod

Attach the camera to the tripod and make sure it is pointed in the right direction. Lock the tripod head in place so the camera does not move. Be sure you know exactly how to adjust the tripod head so that if you need to adjust the composition during the display, you can. If you mount the camera using a quick release plate, check that the plate is securely locked into place. You don’t want the camera to move at all during the photo shoot. If you screw the camera on to the tripod head, make sure the camera is tight so it doesn't start rotating to the left and loosening up.

Set the focus

Setting the focus is the toughest thing to do before the fireworks display actually starts. I usually shoot fireworks from pretty far away, so I set the focus for Infinity, but I leave the Auto Focus on. When the first shell is fired, I wait for it to explode and press down on the shutter release button to activate the Auto Focus. Be sure you are ready to leap into action when that first shell goes off. Look through the camera viewfinder so that you can make sure the focus is in on the explosion and that it is locked. I then turn the Auto Focus off so that the lens will not try to refocus on the next explosion. I recommend against using any type of Live View for this as the Auto Focus is usually slow, which can prevent you from getting a lock on where the fireworks are detonating. That means you have to try again on the next shell, which wastes time.

Set the shutter speed to Bulb

Setting the shutter speed to Bulb will keep the shutter open for as long as the shutter release button is held down. If your camera does not have a Bulb mode, set the shutter speed to 15 seconds. You will need to set the exposure mode to Manual for the Bulb shutter setting to be available.

Attach the release / remote

Once the camera is set up, it's time to attach the remote cable release or set the camera to work from the remote control. To attach the cable release, the cable needs to plug into a port on the camera. Check the camera's user guide to find out exactly where this is done. From experience, it seems that the more expensive and higher end the camera, the more difficult it is to attach the cable release. I suggest figuring this out at home beforehand. The advantage of the cable release is that you don't have to tell the camera that the release is attached. The shutter release button on the cable release works exactly the same as the one on the camera.

If you are using a remote, you need to tell the camera that you are using the remote. This is usually done in the drive mode on the camera, which presents a real issue you need to be aware of: The camera can reset the drive mode after a predetermined amount of time. This means that if you don't take a photo with the remote for a while and then press the button, nothing will happen. Check the drive mode right before you start shooting.

Take a test shot

Take a photograph of the sky using the cable release or remote with a Shutter Speed of five or six seconds to make sure that all the gear is actually working properly. Many folks skip this step, but it's really important because you don't want to waste time dealing with problems once the display starts.

During the Show

Firework displays don't last very long, so you need to be ready to go when they start. Make sure the camera is on, the flash is off, and that the drive mode is set to remote if necessary. Then it is all about timing.

The first couple of fireworks usually yield the sharpest images because there is no smoke in the air yet. As the display goes on, there is more smoke from the previous shells creating more haze in the air. If there is a good wind going, it will clear the smoke (ideally, out of your way). At the same time, the wind can blow the fireworks sideways. That is why it is key to get the focus and exposure settings on the first shell or two.

NOTE:

The following steps apply to using a cable release. If you use a remote, you need to press the shutter release button on the remote once to open the shutter and another to close it instead of just holding the shutter release button down.

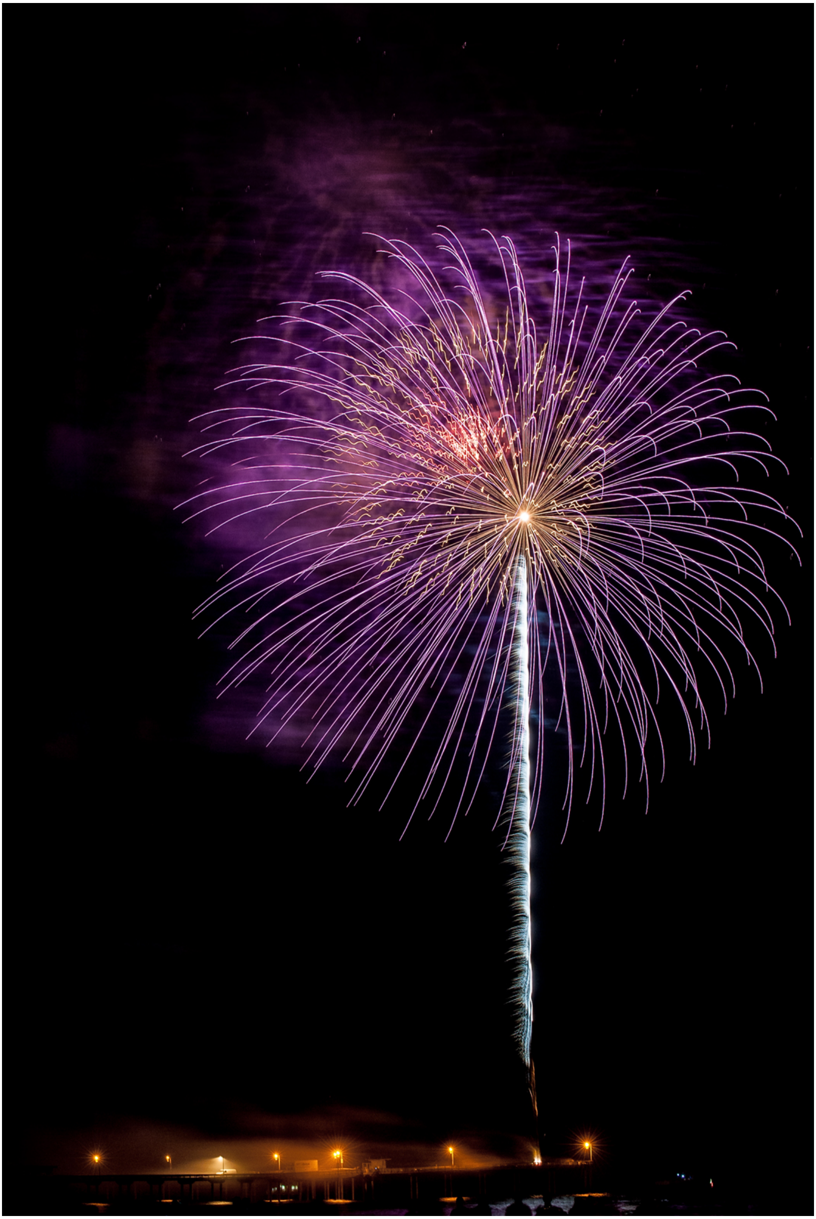
If your camera has a Bulb setting, follow these steps to start shooting:

1. As you see the first rocket fly skyward, press the shutter release on the cable release and hold it while the fireworks explode.
2. Check the image on the back of the camera for focus and composition.
3. Look to see if the fireworks are too bright or too dark. If they

are too light, you need to close the Aperture down, using a smaller opening allowing in less light. If they are too dark, you can either use a longer Shutter Speed or a wider Aperture setting to let in more light.

4. Shoot again.
5. Watch the explosions, opening the shutter as the rockets fly up and closing the shutter after the explosion. The Shutter Speed might be 6 seconds or 15 seconds depending on the display.

That’s the basics of capturing the actual fireworks.



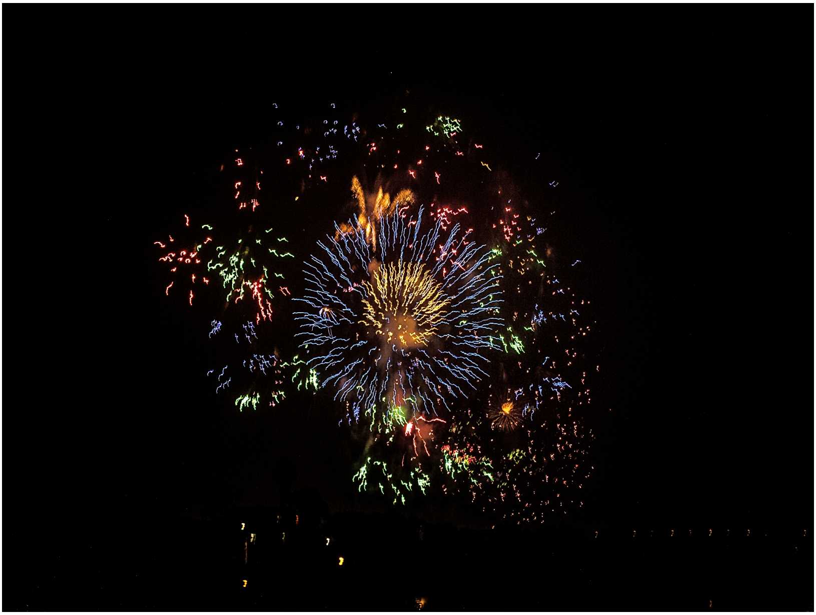
ISO 200, 6 seconds, f/11

Keeping the shutter open for 6 seconds was enough time to capture this single explosion.

Working without Bulb mode

If your camera does not have a Bulb setting, you need to decide how long to keep the shutter open before pressing the shutter release button. There are two ways to do this and still get great shots. The first is to set the shutter speed for 15 seconds, which should give you enough time to get a good shot. Press the shutter release button as you see the fireworks go up and watch to see if the fireworks end before to the shutter closes at the end of the 15 seconds. Check after the first firework to see if the focus and composition are to your liking, then see if the fireworks are too bright or too dark. If they are too bright, you need to close the Aperture down. If they are too dark, open the Aperture up.

You really want to allow enough time for the fireworks to explode and for the camera to record the light trails.

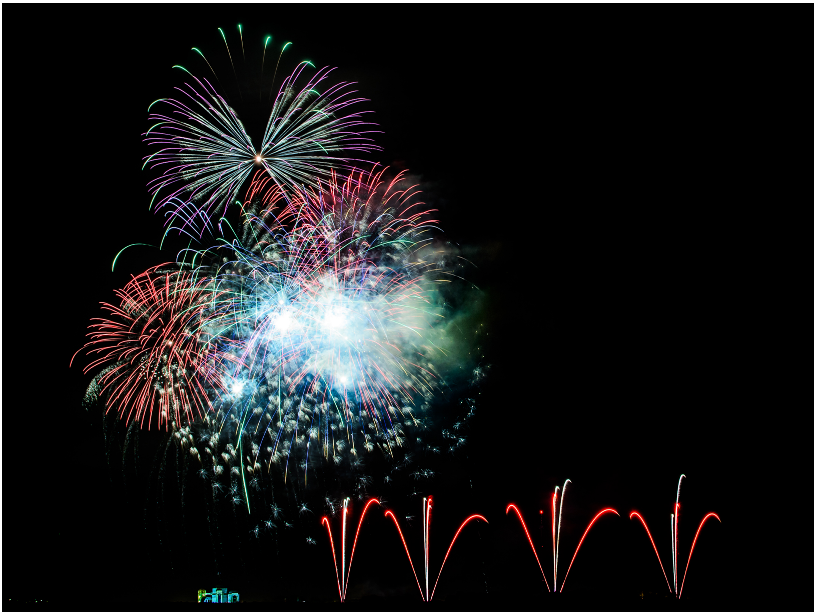


ISO 100,0.5 second, f/5.0

Using a wider Aperture and shorter Shutter Speed didn't allow enough time for these light trails to properly form.

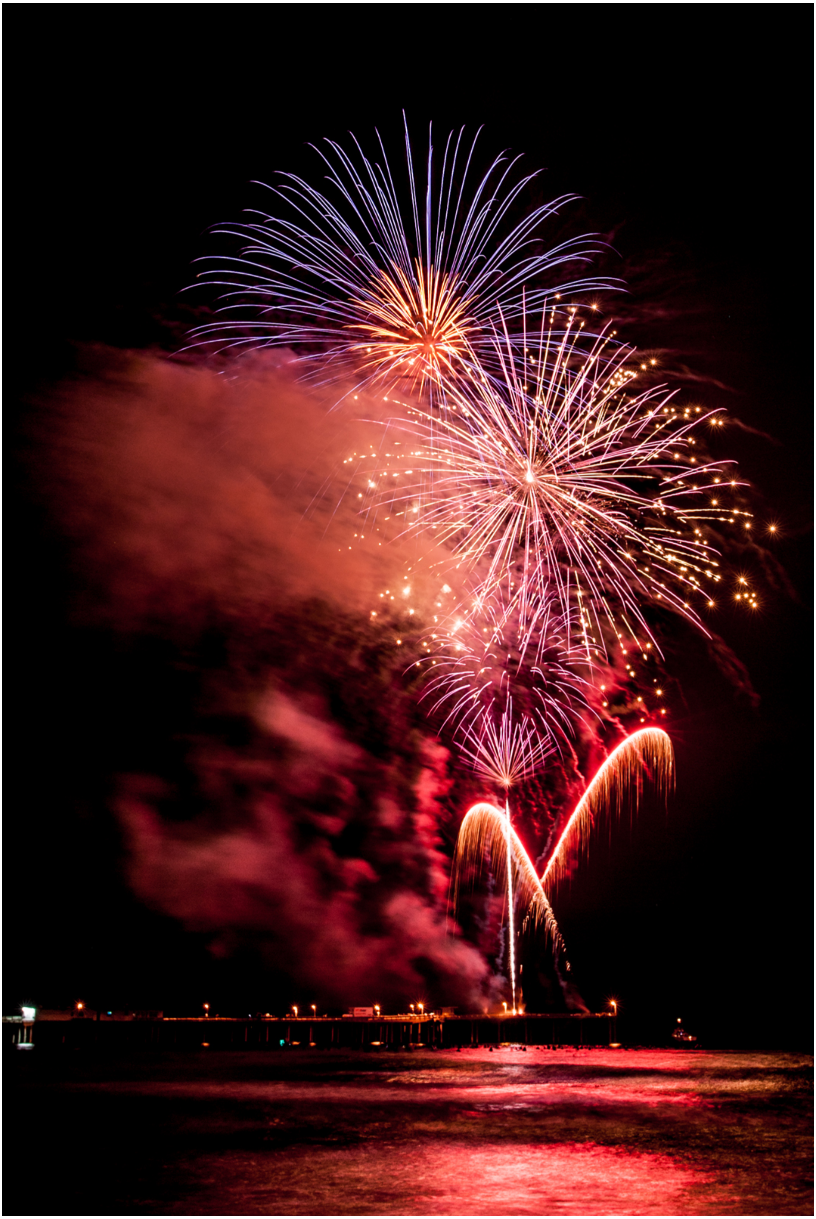
Capturing multiple explosions

The previous techniques work really well for capturing one or two rockets going off, but there is also a way to get multiple explosions in the same frame. You need to leave the shutter open and use a piece of black cardboard or foam core to cover the front of the lens between explosions. This acts like a mechanical shutter, blocking all the light from reaching the sensor. Then, you move the board out of the way for the parts you want to capture. If your camera has the Bulb setting, then you can just open the shutter for as long as you want. But if you don't have the Bulb mode, you need to set the Shutter Speed for 30 seconds, which is usually the longest available on all cameras. This cardboard shutter method works really well and can produce some really great images with the different explosions layered. It works even better when the explosions are at different heights.



ISO 100, 24 seconds, f/11.0

Using a longer Shutter Speed and covering the lens with a piece of black foam core allowed me to capture multiple explosions in the same frame.



ISO 200, 14 seconds, f/10.0

Using a longer Shutter Speed allowed me to capture multiple explosions in the same frame.

Including foreground elements

There is one more situation to take into consideration and this is when you have an object in the frame that you need properly exposed along with the fireworks. This is by far the most difficult situation and takes some practice to get right.

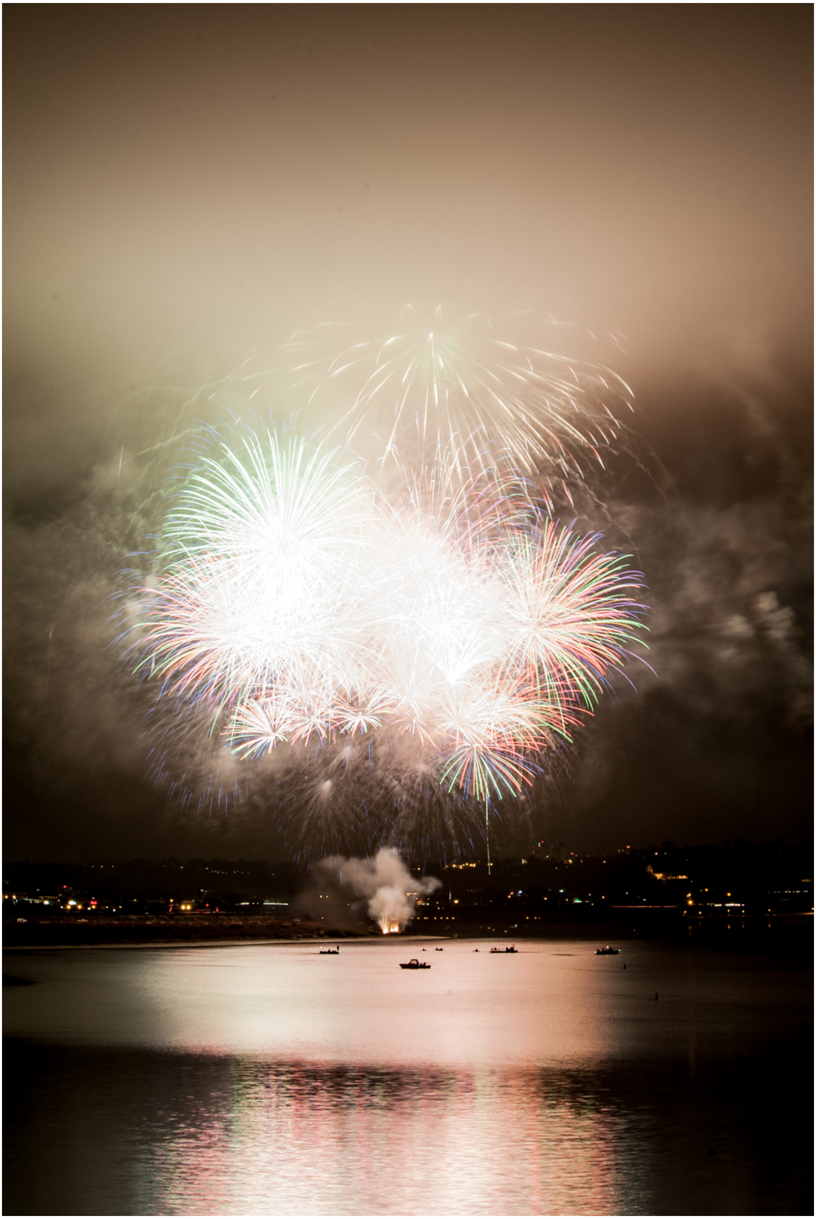
To do this, you will need the black card and some luck. If the proper exposure for the foreground element is ISO 100, f/11, and 12 seconds, then that's the exposure you need to get the shot correctly exposed. However, you will need a longer Shutter Speed to get the fireworks, especially multiple fireworks in the same image. What you can do is cover the bottom of the scene with the black card after the first 12 seconds, allowing the shutter to stay open longer to get more of the fireworks. You need to keep the card moving to prevent a solid line of different exposures in the same frame. Now, this is really tough to get right, especially without a lot of practice, so make sure you experiment to get some frames exposed correctly for the object in your frame.

End of the Show

The finale of a fireworks display is great to watch—usually, the biggest, brightest, most impressive shells are saved until the end and they are shot off at the same time. What this means for the photographer is that there is more light present in the final few minutes compared to the rest of the show. There are two different ways to deal with this and still get a proper exposure.

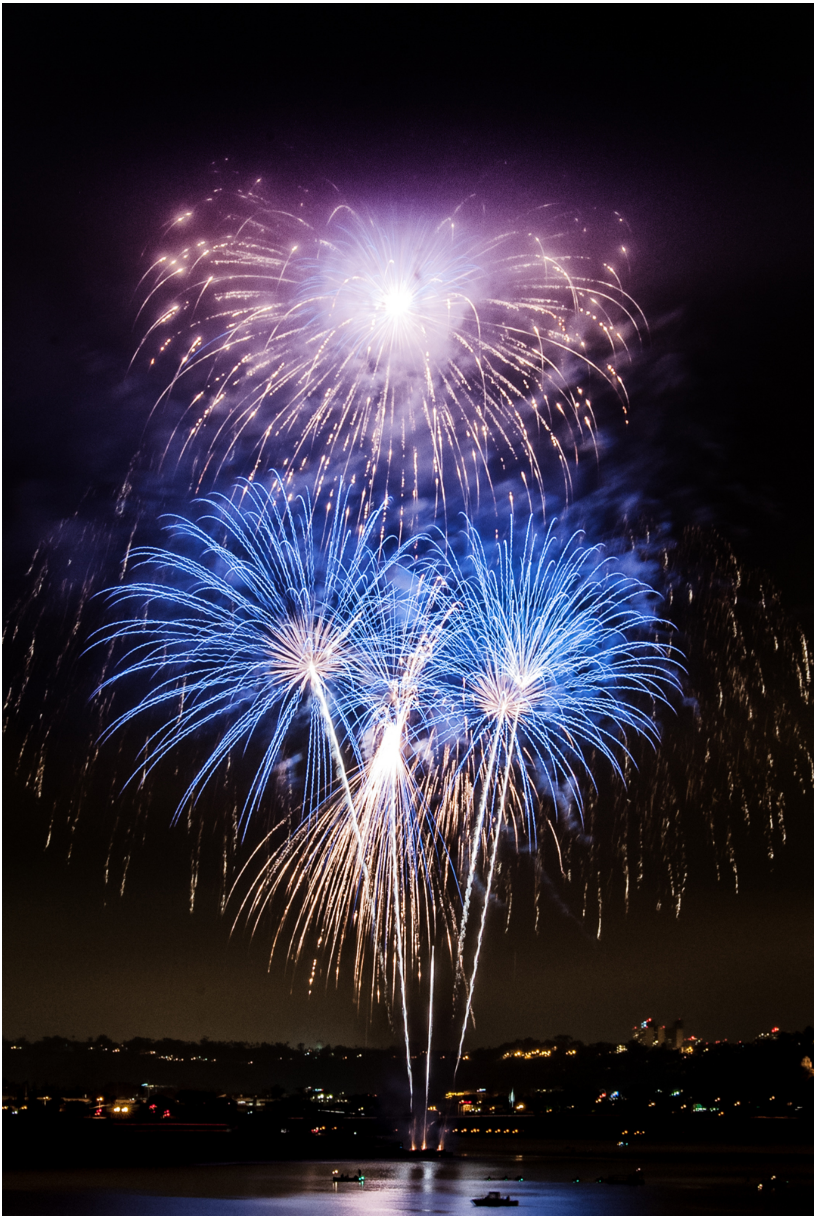
- The first way is to close down the Aperture a stop or two so that less light reaches the sensor in the same amount of time. For example, if you have the camera set to f/8.0 and have been getting good images at 15 second exposure, then try f/11 or even f/16 for the same 15 or so seconds.
- The other method is to use shorter Shutter Speeds and keep the shutter open for only 10 seconds or so.

None of this is written in stone, and it takes some practice. You can see what happens when the finale starts and you don't adjust the exposure in Figure A. The results of the adjusted settings are shown in Figure B.



ISO 100, 24 seconds, f/11.0

A *By not adjusting the Aperture or Shutter Speed for the finale, the final image was overexposed.*



ISO 400, 7.4 seconds, f/16.0

B *By using a shorter Shutter Speed and smaller Aperture, multiple explosions were all rendered properly.*

Tricks of the Trade

How to Be in the Right Spot at the Right Time to Get a Great Shot

For successful fireworks shots—or shots of any other light trail images—you'll need to plan. Plan where you're going to shoot from and what you'll need to bring. And give yourself plenty of time to get all the great shots you want. Read on for details.

Getting There (Early)

After years of photographing fireworks, I've learned a lot about getting myself in the right place at the right time.

- **Check for any restrictions on shooting.** Some places require you to have a permit to shoot, especially if you plan to use a tripod. It is a good idea to look into permits well in advance of the shoot because they can take time to get. If possible, contact the organizers of the event and check with them about any problems.
- **Get there early.** Getting into position before the sun goes down allows you to properly set up. You can get a good spot

before the viewing areas fill up and spot any elements such as trees or electrical wires that will distract from your final images.

ISO 200, 6.8 seconds, f/11.0

Getting set up early allowed me to snag a prime spot on the beach for *the display.*

- **The best shots are at the start.** The first shots have the least amount of smoke so they are the clearest. That's why it is important to get the composition and timing right as soon as possible.

ISO 200, 5.2 seconds, f/10

One of the opening bursts of the display is really clear without any smoke in the air.

- **Watch the direction of the wind.** As fireworks explode, they produce a lot of smoke. If the wind blows the smoke towards you, then the images will get hazy and lose a lot of their impact. You want the wind to be blowing away from the display so that the smoke gets pushed out of the way. There is not a lot you can do except change your position relative to the display.

Packing Up

Photographers are usually pretty good about bringing camera supplies, but photographing fireworks requires some extras.

- **Be prepared.** I pack a small cooler with a bottle of water or two and an energy bar or two along with a small flashlight, extra batteries, extra memory cards, and rain protection for my camera. I also make sure I have a warm jacket and maybe something to sit on. Basically, I bring everything I can think of that I might need for the shoot. With photo shoots, remember that if it can go wrong it probably will.

- **Use a good tripod.** Your camera needs to be rock steady to capture great fireworks photos, and that means you need a good tripod. Make sure the legs are on a solid surface and won't move during the shoot. I've said it before and I'll say it again: Nothing is as important as a solid base when shooting long exposures.
- **Don't forget your cable release/remote.** You will need a cable release or remote to trigger the shutter release on the camera without having to actually touch the camera. After all, the more you touch the camera, the greater the chance of your images being blurry.

ISO 100, f/14, 6.9 seconds

A cable release allowed me to watch the fireworks and capture the multiple explosions in the same frame.

Start Shooting—and Keep Shooting

The more you shoot, the better chance you have of getting a great picture.

- **Make sure the flash is turned off.** Not only will the flash not help at all, but it could ruin the image by illuminating stuff right in front of the camera.
- **Shoot in Manual mode.** No matter how fancy and automatic your camera, you have to shoot in Manual mode. If you are having problems getting the right settings, check to make sure that your camera is in Manual exposure mode. I also confirm that the camera is set to Auto White Balance.
- **The display gets brighter towards the end.** Remember to adjust the shooting time or aperture at the end of the display. Otherwise, the finale that looks so good in person will end up overexposed.
- **Shoot as much as possible.** Fireworks displays don't come around everyday so take as many photos as possible. I make sure that I shoot as much of the display as possible, starting with the first explosion and shooting continuously until the end. I try to keep even the longest exposures to a maximum of 45 seconds.

Wrapping Up

Fireworks mark special occasions, so when you capture the true magic of them in your images, you can create lasting memories. I hope the information in this book will get you to that point sooner rather than later. If you have a big special event coming up—say, a trip to Disneyland—I encourage you to practice your skills at any small fireworks display you can find. Try to remember what works for you and your camera. If you do nothing else, please remember these four things: Use a tripod, turn off the flash, shoot in Manual mode, and use a cable release. Good luck!

Photographing Fireworks: The Right Gear, Location, and Techniques for Capturing Beautiful Images

Alan Hess

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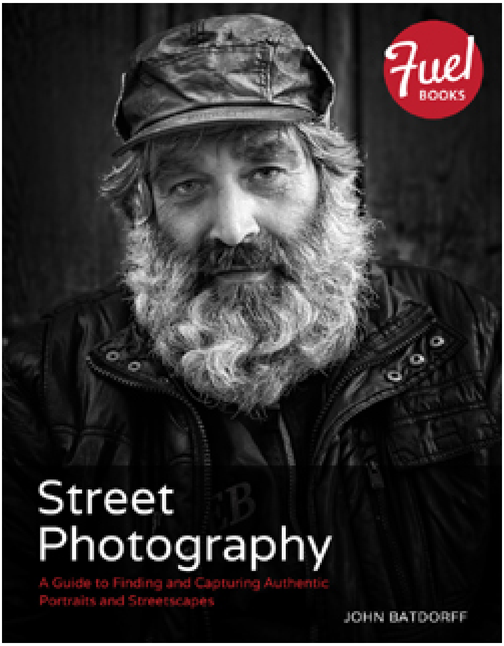
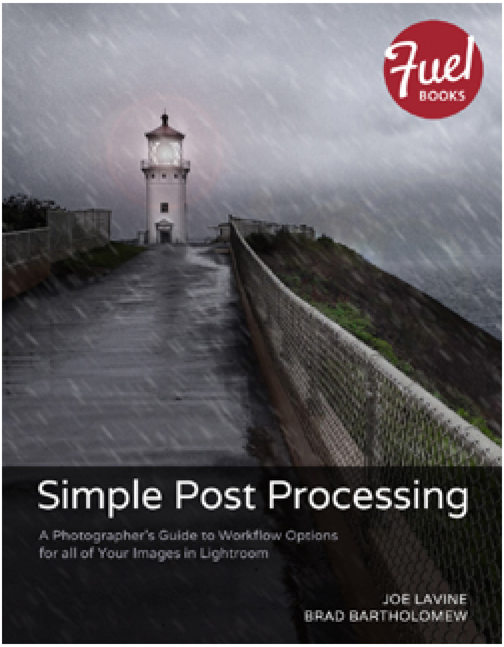


Street Photography

A Guide to Finding and Capturing Authentic Portraits and Streetscapes

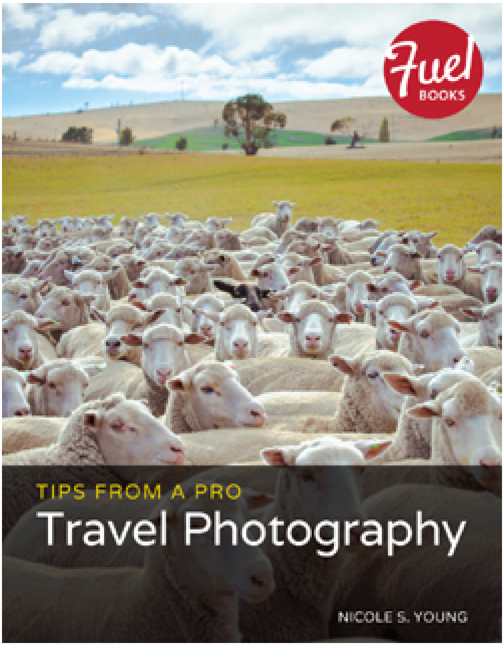
JOHN BATDORFF



Simple Post Processing

A Photographer's Guide to Workflow Options for all of Your Images in Lightroom

JOE LAVINE
BRAD BARTHOLOMEW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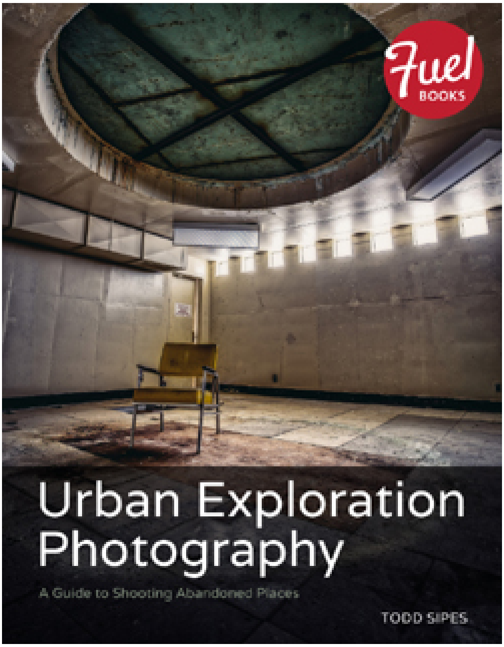
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